

WHAT IS CLAIMED IS:

1. A solid electrolyte for rechargeable cells, comprising:
5 an electrolyte film having a thickness of 10 to 200 μm and
microporous structures; and
an ion conductive liquid electrolyte in an amount of 30 to 90 %
by weight based on the total weight of the electrolyte including liquid
electrolyte,
10 wherein said electrolyte film contains an absorbent having a
particle size not more than 40 μm in an amount of 30 to 95 % by
weight based on the total weight of the electrolyte film under the dried
condition that no liquid electrolyte is contained therein.
- 15 2. A solid electrolyte for rechargeable cells according to
Claim 1, in which said electrolyte film is prepared by the wet process
comprising the steps of:
dissolving a mixture of an absorbent and a polymer binder in a
solvent for the polymer binder,
20 making the resulting solution into a film,
exchanging the solvent with a non-solvent for the polymer
binder, and then drying the resulting material.
- 25 3. A solid electrolyte for rechargeable cells according to
Claim 1, in which said electrolyte film is prepared by the dry process
comprising the steps of:

dissolving a mixture of an absorbent and a polymer binder in a solvent for the polymer binder,

adding a non-solvent for the polymer binder, a pore former and a dipping agent to the resulting solution, and

5 making the resulting solution into a film and then drying the resulting film.

4. A solid electrolyte for rechargeable cells according to Claim 2 or Claim 3, in which

10 said solid electrolyte is prepared by an activation procedure in which an ion conductive liquid electrolyte is absorbed into said electrolyte film, and

15 said ion conductive liquid electrolyte is obtained by dissolving one or two or more lithium salts selected from the group consisting of LiClO_4 , LiBF_4 , LiPF_6 , LiAsF_6 , LiSCN , LiCF_3SO_3 , $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ and $\text{LiC}(\text{CF}_3\text{SO}_2)_3$ in a mixture of one or two or more organic solvents selected from the group consisting of ethylene carbonate, propylene carbonate, dimethylcarbonate, diethylcarbonate, ethylmethylcarbonate, γ -butyrolactone, 1,3-dioxane, tetrahydrofuran, 2-methyltetrahydrofuran, 20 dimethylsulfoxide, sulfolane, N,N-dimethylformamide, diglyme, triglyme and tetraglyme in a concentration of 0.5M to 2M.

5. A solid electrolyte for rechargeable cells according to Claim 2 or Claim 3, in which

25 said absorbent is a mixture of one or two or more selected from the group consisting of porous polymer particles such as polyethylene, polypropylene, polystyrene, polyurethane, pulp, cellulose, cork and

wood powder; mineral particles such as clay, paragonite, montmorillonite and mica; synthetic oxide compounds particles such as zeolite, porous silica and porous alumina; mesoporous molecular sieves having 2 to 30 nm of pore diameter made of oxide compounds or
5 polymers; and other commercially available absorbents;

said polymer binder is a mixture of one or two or more selected from the group consisting of copolymers of polyvinylidene fluoride, vinylidene fluoride and hexafluoropropylene, copolymers of vinylidene fluoride and maleic anhydride, polyvinylchloride,
10 polymethylmethacrylate, polymethacrylate, cellulose triacetate, polyurethane, polysulfone, polyether, polyethylene, polypropylene, polyethylene oxide, polyisobutylene, polybutylidene, polyvinylalcohol, polyacrylonitrile, polyimide, polyvinyl formal, acrylonitrilebutyldiene rubber, ethylene-propylene-diene-monomer, tetraethyleneglycol
15 diacrylate, polydimethylsiloxane, polycarbonate and silicon polymer, or their copolymer;

said solvent for dissolving polymer binders is a mixture of one or two or more solvents selected from the group consisting of N-methylpyrrolidinone, dimethylformamide, dimethylacetamide,
20 tetrahydrofuran, acetonitrile, cyclohexanone, chloroform, dichloromethane, hexamethylphosphoramide, dimethylsulfoxide, acetone and dioxane; and

said non-solvent for the polymer binders is a mixture of one or two or more selected from the group consisting of water, ethanol,
25 ethylene glycol, glycerol, acetone, dichloroemethane, ethylacetate, butanol, pentanol, hexanol and ether.

6. A solid electrolyte for rechargeable cells according to Claim 5, in which said absorbent is a mixture of one or two or more selected from the group consisting of mineral particles, synthetic oxide compounds particles and mesoporous molecular sieves.

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7. A lithium rechargeable cell, which is obtained by the following steps of:

dissolving a mixture of an absorbent and a polymer binder in a solvent for the polymer binder,

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making the resulting solution into a film,

exchanging said solvent with a non-solvent for the polymer binder and drying it to form a microporous electrolyte film containing the absorbent,

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assembling the resulting electrolyte film together with a cathode and an anode separately prepared to form a cell, and then

subjecting the resulting cell to absorb an ion conductive liquid electrolyte.